GREENLAND

General 59
Buoyage System 59
Currency 59
Currents 59
Geophysical Features 60
Government 60
Holidays 62
Ice 62
Industries 64
Languages 65
Meteorology 65
Navigational Information 66
Offshore Drilling 66
Regulations 66
Search and Rescue 67
Time Zone 68
U.S. Embassy 68
Appendix 69

General

Greenland, the world's largest island, is known nationally as Gronland. It lies on the American continental shelf between 59˚45'N and 83˚40'N, and along 10˚50'W and 73˚00'W. The country of Greenland has a total area of 840,000 square miles, of which more than 80 per cent are ice-covered.

Buoyage System

West Greenland

The IALA Buoyage System (Region A) is in effect in West Greenland. See Chart No. 1 for further IALA Buoyage System information.

From 1990, all newly-erected and restored beacons which arerequired to be held to port in an incoming direction, will be fitted with topmarks in accordance with IALA rules. Hence, port beacons with red can topmarks and beacons with a triangle point down can be expected.

In marking of inner routes of West Greenland, a lateral system of beacon towers is used along the coast. The beacon towers are about 5m in height and normally fitted with triangular topmarks. Most beacons are painted red and stand in a yellow barrel; some are painted yellow, but all are charted in red on Danish charts.

For the purpose of marking the terms "starboard-hand" and "port-hand" denote, respectively, the side on the right or left hand of the mariner when proceeding N along the coast, regardless of whether the route runs for a short distance in an E or W direction, and into harbor.

Starboard-hand beacons are triangular, point up.

Port-hand beacons are triangular, point down.

Currency

The official unit of currency is the Danish krone, consisting of 100 ore.

Currents

In the S, the West Greenland Current runs at a considerable rate, especially close in to the coast. It is noted that this current runs stronger in September than it does in June, when its mean rate is not less than 3 knots close inshore and a few miles farther offshore it runs 1 to 2 knots. To the N of 62˚N the mean rate is reduced to less than knot. The Canadian Current usually runs at about 0.5 to 1 knot as far as Cape Dyer; to the S of it the current runs at 0.5 knot or less.

Geophysical Features

The icecap that covers the interior of Greenland is the largest single ice sheet in the N hemisphere. The sheet is 3,350m thick and lies on the rock floor at slightly below sea level. The icecap has two domes or foci of growth, both lying E of the center line of the island; one at 65˚N that rises to a height above 2,400m, and the other at 75˚N that rises to about 3,050m. Greenland can be divided into two natural regions-the interior, which is covered by an ice cap, and the coasts.

East Coast of Greenland

The E coast is indented and includes the longest fjord in the world. The coast is fringed with islets and islands of varying size and by a border of ice-free land of varying width that affords scanty opportunity for the maintenance of life of any kind.

The musk-ox is found in certain parts, and the seal frequents the fjords in season, but both animal and vegetable life are comparatively scarce due to ice. The E coast of Greenland is less accessible than the W coast.

In this ragged coastline with its many deep fjords, the wind is strongly affected by local topography, and different winds may be blowing at places only a short distance apart. The funneling of the wind through a steep fjord may produce winds much stronger than the general air flow, while other adjacent fjords provide good shelter and lighter winds.

Local wind flow in the region is the down-slope katabatic wind that develops from the drainage of cold air from the Greenland ice cap into the fjords and out to sea. This effect in the winter produces the most frequency of gales in the fjords, in the nature of a cold air avalanche.

Observations made at the head of a small fjord about 30 miles from Ammassalik, where a wind of 112 knots that blew away the anemometer cup and reached hurricane force for 11 days during October to April, was observed.

Most gales develop around midnight. The temperature changes 2˚C in most cases; but when foehn winds cross the ice cap, the temperature can change 10˚C.

The wind-chill hazard is severe in these storms. In the case of the down-slope katabatic gales, there is usually little warning from the barometer readings, but clouds of snow blowing on the edge of ice cap usually indicate that the gale is raging shortly before it reaches the lower level of the fjord.

South Coast of Greenland

During the months of October to April, at Torgilsbu in S Greenland, gales (force 9) are reported to last 4 to 7 days; they last 2 days or less during May to September.

Sastrugi (sharp and irregular waves formed by persistent winds on a snow surface) is predominantly E along most of the N coast of Peary Land, although there are local winds in the valleys.

West Coast of Greenland

The W coastal region remains with an almost continuous ice-free belt, varying in width from about 1 mile to over 100 miles. Much of the coast is fringed with islands, mountainous and high, in places to a height of over 2,000m, that obscure all view of the ice cap from coastal waters. Raised beaches occur along the coast, but in recent times Greenland has been sinking, by as much as 10mm a year at Godhavn.

Between Kap Farvel, at the S end of the W coast, the average width of the ice-free belt is about 50 miles and consists of islands, promontories, and mountains penetrated by deep fjords. Conditions vary considerably in different localities and are described later in the text.

In the ice-free belt farther N, it is much narrower; around the shores of Melville Bugt, the coast is a nearly continuous wall of ice within which occasional steep, rocky summits or nunataks protrude.

Farther N between **Kap York** (75˚55'N., 66˚25'W.) and the Humboldt Gletscher, the largest of the Greenland glaciers, the ice cap lies some distance from the coast and only through the larger valleys do glaciers push down to the sea.

The Humboldt Gletscher marks a change in the character of the coast. South of it mostly consists of gneiss, which is usually covered by sand and limestone, forming plateaus with escarpments. Beyond the Humboldt Gletscher, the NW coast of Greenland is mostly steep stratified cliffs, forming the outer edge of a broad belt of plateau that borders the icecap. Only occasional narrow valleys cut in between the plateau, and through these long, almost horizontal valleys, glaciers stretch down to the coast where, in many places, they merge imperceptibly with the sea ice.

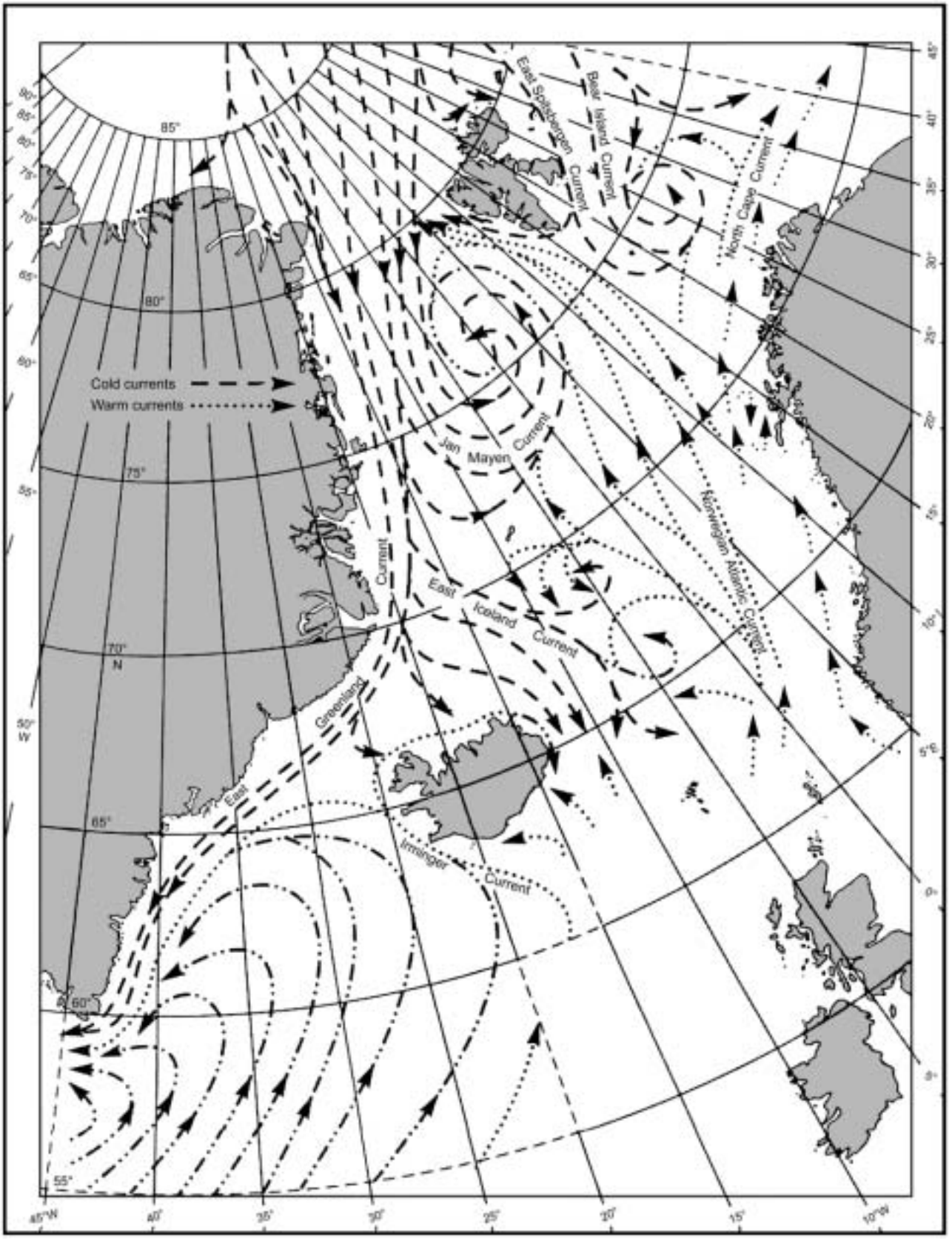
Government

In 1814, the Union of Denmark and Norway was dissolved; sovereignty over Greenland was retained by Denmark only over the W coast and a trading station on the E coast. In 1921, Danish sovereignty extended to the whole of Greenland, leading to a dispute with Norway who supported a claim by Norwegian hunters to part of the E coast. The Danish claim was upheld by the International Court of Justice in 1933. In 1931, the first air crossings of the Greenland icecap were made by German W. von Gronan, from E to W, and American P. Cramer, from W to E. In 1941, Greenland was declared a protectorate of the United States for the period of World War II (1939-1945), following the German invasion of Denmark in 1940. In June 1953, Greenland became an integral part of the Danish Realm, with its capital at Godthab, the people attaining equal rights with all other Danish nationals, and representation in the Danish Parliament. West Greenland, one of three areas into which the country is divided, is administered by the Greenland Council, working through local councils. The President of the Council is the Governor of Greenland who is appointed by the Minister for Greenland in Copenhagen.

Greenland achieved Home Rule in 1979, while remaining within the framework of the unity of the Danish Realm. The Home Rule government consists of an elected 31-member Home Rule Parliament (Landstinget) and an administration headed by a local government (Landsstyret).

The legal system is Danish.

The capital is Nuuk (Godthab).



General Surface Water Circulation

Holidays

The following holidays are observed:

New Year's Day	January 1
Maundy Thursday	Variable
Good Friday	Variable
Easter Monday	Variable
General Prayer Day	Fourth Friday following Good Friday
Ascension Day	Variable
Constitution Day	June 5
Whit Monday	Variable
Christmas Day	December 25
Boxing Day	December 26

Ice

Ice terms, their definitions, and photographs of typical ice formations are contained in Pub. 9, The American Practical Navigator (Bowditch).

Vessels in Greenland waters may receive Facsimile Ice Charts from the Narssarssuaq Ice Center (61˚10'N., 44˚26'W.) at:

Telephone: +299 5247 (from 0800-1200 and 1300-1600 LT)

+299 5244 (For emergencies or at other times, Sundays, and Public Holidays)

Current Ice Charts of Greenland waters may be requested 24 hours by telefax from the Ice Center at:

Fax: +299 66 5344 (auto service)

Between **Frederiksdal** (60˚00'N., 44˚40'W.) and **Kraulshavn** (74˚07'N., 54˚04'W.), there are sheltered inner routes through the channels among the islands which fringe the W coast of Greenland.

Local knowledge is required for use of these routes, which are generally used by coastal vessels of lesser draft.

Ice Reconnaissance

Ice reconnaissance flights are carried out in the Frederikshab, Kap Farvel, and Tingmiarmiut area; further information is contained in Pub. 117, Radio Navigational Aids. In addition, during the navigation season, ice air-reconnaissance (ISRECCO) is carried out from **Mestersvig** (72˚12'N., 24˚04'W.) for the benefit of ships bound for the coast between Ammassalik and Danmarkshavn.

Ships may establish communication with aircraft on ice reconnaissance or search duty. Request for instructions can be made from the nearest coast radio station.

The Danish Meteorological Institute transmits facsimile transmissions of ice charts for Greenland waters. See Pub. 117, Radio Navigational Aids for further information.

Sea Ice

Sea ice presents serious hazard to navigation over much of the area covered by this publication throughout the year. Small or large icebergs may be encountered along the Greenland coast at any time. Seasonal variations do not influence iceberg movements, except to trap icebergs in pack ice.

The whole E coast of Greenland is ice-bound for the greater part of the average yea,; although the coast S of 70˚N is usually almost ice-free in August and September. The coasts of Svalbard and Jan Mayen are usually ice-bound each winter, but the coasts of Iceland remain ice-free throughout the average year, except for the formation of ice in rivers and at the heads of some fjords. In severe seasons, ice reaches the N and E coasts of Iceland, closing Denmark Strait.

The East Greenland Current brings vast quantities of ice and cold water out of the Arctic basin, and accounts for the presence of ice off the E coast of Greenland over the greater part of the year; whereas, the relatively-warm Norwegian Atlantic Current, of Gulf Stream origin, prevents the formation of ice over the greater part of the Norwegian Sea and the S portion of the Barents Sea. Thus, the limits of the sea ice lie much farther S off the E coast of Greenland than elsewhere.

At the time of maximum extent the S progress of the ice flows, carried by wind and current, is more or less in balance with the degree of melting at the ice edge. Thereafter, as air and sea temperature rise, the ice edge steadily retreats due to the increased rate of melting at progressively higher latitudes, though in many areas wind and current will tend to carry the melting ice flows S.

Ice (Monthly Limits)

The ice limits is the demarcation at any given time between the open sea and sea ice of any kind, whether fast or drifting. The use of all data, were it available, would probably mean that the maximum and minimum limits would lie up to 30 miles beyond those shown in the graphics, at least in some areas.

The width of the zone between the maximum and minimum limits on each graphic indicates the degree of variability between conditions in a severe and a light ice season in the same month. The severity of the ice season is due to the result of the winds. When winds cross the ice edge for several weeks, the ice edge moves steadily seaward; whereas, when winds cross over the water toward the ice edge, the ice retreats to its minimum position. This pattern follows everywhere except lesser in the region off the SE coast of Greenland, and off the W coast of Spitsbergen. This is due to upwelling, the presence of relatively warm deep currents which converge against the cold ice-bearing current in these areas.

Any ice flows driven out over these warm currents by winds off the ice would melt fairly quickly. The width of the transition belt between ice-free conditions and an almost complete cover of sea ice depends on the winds and the season of the year. Winds off the ice tend to produce a gradual transition, whereas winds to the ice produce a compact ice edge. Over most of the area the mean wind directions are in most months roughly parallel to the ice edge, so the transition belt is usually only a few miles wide, perhaps less than 10 miles; however, in places it may exceed 50 miles. Seasonal melting also affects the width of the transition zone, and in general, it is greatest in July and August, when its width may span several hundred miles.

Ice (Monthly Distribution)

During September and October, sea ice usually reaches its least extent shortly after the end of August. At this time, a tongue of ice is carried S in the East Greenland Current off the Greenland coast as far as 71˚N, while the coast is usually almost ice-free from wind effect openings of polynyas. Therefore, navigation in this area should be avoided. If a sea breeze is expected then the ice can beset unexpectedly.

The remaining coasts in the area, except for the far NE of Svalbard, are ice-free. In a light ice year, the minimum limit lies considerably farther N, but it must be remembered that this is an average estimation of minimum ice limit; and in a light ice year only parts of the E coast of Greenland N of about latitude 74˚30'N may expected to be accessible.

In a severe winter year, the ice maximum limit encloses the E coast of Greenland almost as far as Kap Farvel; it also encloses the N and most of the E, including the coasts of Svalbard. The maximum limit of ice lies farther SE than the area S of 65˚N, leading up to 100 miles farther S at 25˚E in the Barents Sea.

During October, the ice edge advances S in all longitudes, making its greatest advance within the East Greenland Current and in the East Spitsbergen Current. In a severe year, almost the whole E coast of Greenland is enclosed by the maximum limit at this time. This maximum limit almost reaches Jan Mayen and, though it is held back N of 79˚N at about 6˚E, it encloses the coasts of Svalbard as it plunges S to Bjornoya. In a light ice year, the E coast of Greenland S of about 68˚N, and the whole of Svalbard, are almost ice-free.

In November, the greatest advance of the ice edge in all longitudes occurs, presumably due to the extensive cooling of the sea surface to its freezing temperature. In the average year almost the whole E coast of Greenland is enclosed by the ice edge by the end of this month; Jan Mayen and much of the coastline of Spitsbergen are also enclosed. A noteworthy feature in the shape of the ice edge at this time is the first indication of a bulge to the NE of Jan Mayen. This bulge, the Jan Mayen Ice Tongue (Jan Mayen Odden), is largely due to the freezing of the cold water in the Jan Mayen Current.

In a severe season, at the end of November, the Denmark Strait is almost closed and the Jan Mayen Ice Tongue extends well E of the Greenwich meridian. In the Barents Sea in such a year, the maximum limit lies S of Bjornoy, though the warmer waters of the West Spitsbergen Current hold it back at about 79˚N in along 6˚E. In a light season the ice is much less extensive over the Greenland Sea and the Barents Sea, and the coast of Greenland S of about 67.5˚N, Jan Mayen, and the whole of Svalbard are all almost ice-free.

From December to March, the ice edge advances only slowly over the greater part of the area. The ice edge usually reaches its greatest extent in February and March. The S limit off East Greenland gradually reaches Kap Farvel during January, and at the end of February lies about 20 miles S of the cape. In the Barents Sea, the ice edge reaches Bjornoya in December. From November to March, the position of the ice edge in the area S of Denmark Strait shows little change; this is largely due to the containing effect of the warm Irminger Current. Much of Svalbard is ice-bound by late December and the whole archipelago is enclosed by early January.

The Jan Mayen Ice Tongue extends E to reach its greatest extent in February. A noteworthy feature is the development of North Bay, a bight on the N flank of the Jan Mayen Ice Tongue. During March, North Bay usually extends SW, presumably due to the fact that the NNE winds which have prevailed during the earlier winter months are much stronger in March

By late March, the ice edge has advanced to within about 20 miles of the NW tip of Iceland, and lies about 30 miles SE of Jan Mayan.

Ice conditions from December to March show a high degree of variability between a light and a heavy year over the greater part of the area, except for the region SW of the Denmark Strait, where the maximum and minimum limits are separated by only 50 to 100 miles. Elsewhere, they are separated by up to about 300 miles.

In a severe season, the ice edge may lie up to 100 miles S of Kap Farvel, up to 80 miles SE of Jan Mayen, and up to 60 miles S of Bjornoya. Though this maximum limit may approach the N coast of Iceland as early as December, it does not effectively close Denmark Strait until March. The Jan Mayen Ice Tongue extends E to about 10˚E at the end of March in a severe winter year. Since its developments involve a prolonged period of W winds, that will simultaneously cause the ice edge S of Spitsbergen to retreat E, the large northreaching bight in the ice edge centered about 7˚E is unlikely to become cut off. In the W part of the Barents Sea during a severe ice season the ice edge is located between 73.5˚ and 74.5˚N from December to February.

Though the E coast of Greenland, except for the extreme S, remains ice-bound even in a light season, the ice edge in such a season is located in the NW half of Denmark Strait and well NW from Jan Mayen throughout the period December to March. This minimum lies N of the N coast of Svalbard, as far as 20˚E; the whole of the W coast and much of the S coast are also ice-free. Though this limit lies well N of Bjornoya, it encloses Hopen throughout the period.

From early April, the ice edge gradually retreats N in the average year, reaching its minimum extent in most longitudes in early September. The rate of retreat is greater over the Greenland Sea W of about 5˚W and in the Barents Sea than it is elsewhere. From April to July the average rate is about 40 miles per month, and in the Barents Sea about 60 miles per month; the mean rates are much less in August.

There is little movement of the ice edge SW of the Denmark Strait from early April to late June; the total retreat in the average season varies between 20 and 60 miles in this period. Over most of the region W of Svalbard and N of 75˚N, the total ice edge retreat is only about 60 miles between early April and early September.

By early August, in the average season, the extent of ice cover over the Greenland Sea has been greatly reduced, but a relatively narrow belt of ice still encloses the whole E coast of Greenland S to and beyond Kap Farvel. During August the S portion of this narrow belt usually melts.

Drift ice in the Greenland Sea usually clears Jan Mayen late in April; at this time a small part of the NW coast of Spitsbergen is usually almost ice-free, but it is late May before most of the W coast becomes accessible. By late August, close to the time of minimum extent, the whole of Spitsbergen is usually almost ice-free.

By late August, the E coast of Greenland is accessible up to about 74˚N, apart from the area S of Kap Brewster. However, because the ice is not far away, fresh E to SE winds can cause it to close rapidly on the coast N of Scoresby Sund. Scoresby

Sund usually becomes almost ice-free by mid-July and remains so till early October.

Shore leads, sometimes extending hundreds of miles, may open up off the coast of Greenland in almost any month when offshore winds prevail, while winds with an onshore component will rapidly close up these leads; the momentum of the ice is such that only riding on the ice would prevent destruction.

An interesting feature of the summer break-up pattern is the polynya that usually develops off the NE coast of Greenland. In the average year it first appears in May, during which month the NNE winds of winter are replaced by the NW winds which persist till August. The polynya usually reaches its greatest size by late June or July, and usually closes up entirely in September.

The foregoing paragraphs describe the summer break-up in the average year, but there are considerable departures from the mean condition in severe and light summer ice seasons, except in the region SW of Denmark Strait, where the variability is much reduced.

In a severe ice season, the maximum limit encloses the E coast of Greenland throughout the summer, except for the extreme S from August to October. Denmark Strait may remain closed till late July; the remainder of the N coast of Iceland, and parts of the E coast, may be affected by sea ice till early June. Jan Mayen may remain ice-bound till mid-August and the W coast of Spitsbergen may not become ice-free till late July; Hopen and the E coast of Svalbard may not become accessible till mid-August. The N coast of Spitsbergen, the whole of Nordaustlandet, and the E parts of Barentsoya and Edgeoya remain within the maximum limit throughout a severe summer season.

In a light season, parts of the E coast of Greenland may become ice-free by late May. By late July the minimum limit lies in about 76˚N off the E coast of Greenland. Though this limit is shown lying N of Bjornoya and NW of Jan Mayen in each month, this should not be interpreted as meaning that both islands have been ice-free throughout a complete year. In fact, at each island large quantities of sea ice have appeared for at least a few weeks each year.

Ice Development

The zone between the ice edge at the time of maximum and minimum extent is representative of the area in which the ice melts more or less completely in the average summer. If the occurrence of ice in this zone in the following winter were due solely to freezing of the sea surface there, then this area would become covered by first-year or younger forms of ice. That this is not so is due to the action of wind, current, and polar gyre (rotation of the Polar Ice Cap), which brings vast quantities of multi-year ice out of the polar basin. This effect is most marked in those parts affected by S currents, such as the East Greenland Current, the East Spitsbergen Current, and the Bear Island Current. In this zone, all stages of development may occur.

New to young ice will usually predominate at the ice edge, the ice flows gradually thickening with increasing distance from the edge to become first-year ice. Except in the body of the East Greenland Current, first-year ice predominates over the Greenland Sea by the end of winter, though old ice flows also occur with increasing frequency as the E flank of the East Greenland Current is approached. Within this current, old ice predominates; each winter and spring many old ice flows, known locally as Storis, are carried S to round Kap Farvel.

Old ice predominates N of the ice edge at the time of minimum extent, though the whole range of younger stages from new ice to first-year ice will also occur due to the re-freezing of small open water areas which are continuously formed by the differential movement of the ice flows constituting the pack ice.

In the Norwegian Sea and the W part of the Barents Sea, in areas in which the ice usually melts in summer, the predominant stage of development in winter is first-year ice, but some old ice flows will be found within and near to the East Spitsbergen Current and the Bear Island Current.

Icebergs (Distribution)

The chief source of icebergs in the area covered by this publication are the glaciers on the E coast of Greenland, which collectively produce enormous quantities of icebergs. Most are carried S in the East Greenland Current, some surviving the journey to round Kap Farvel, while some are carried towards the N and NE coasts of Iceland by the East Iceland Current. The largest numbers will be found close-in to the coast of Greenland; the frequency of icebergs decreasing to a few on the E flank of the East Greenland Current, which may perhaps be considered the average limit of icebergs. There is no record of icebergs having been carried SE or E in the Jan Mayen Current. Some icebergs which have originated from Spitsbergen and Zemlya Frantsa Iosifa are carried SW in the East Spitsbergen Current and the Bear Island Current towards Bjornoya, especially during the period May to October.

In general, this limit moves SE from September to April and then retreats till August, except on the SE side of the Denmark Strait, where it is held at about 65˚N by the Irminger Current throughout the year. During April, when the monthly maximum limit reaches an extreme position, it is located about 400 miles SE of Kap Farvel. There is insufficient data to define limits to the N of the Denmark Strait, but icebergs, sometimes grounded, are observed off the N and NE coasts of Iceland. Glacier debris, consisting of growlers and small pieces of land ice, is sometimes carried out of the fjords by the currents in late summer, when the S part of the E coast of Greenland is free of sea ice, in sufficient quantities to hamper the progress along the coast of small vessels.

Industries

Fishing and fish-processing are the most important occupations; the leading products are cod, wolf-fish, halibut, fish oils, shrimp, and salmon. There are many stations where cod is salted or dried, and several canneries and freezers for varieties of other products.

Hunting is also important; leading products are feather and eider down, skins, and furs. Some farming, principally of sheep, is carried on in the SW part of the country.

Cryolite, used in the electrolytic production of aluminum, was previously exported from Ivigtut, where the only known commercially-significant deposit in the world occurs.

Most of the country's trade is with Denmark and the United States. Exports consist of fishing, hunting, and mining

products. Imports include machinery, transport, processed metals, fuel and lubricants.

Greenland is incorporated into the European Economic Community, due to integration with Denmark.

Languages

Both Danish and Eskimo are used; Eskimo in the written form is a recent introduction.

Meteorology

Fog and Visibility

Fog is a serious hazard to navigation in most of this region, especially on routes exposed to winds between the SW and SE. Maximum frequency over the open sea occurs during the period June to September and may persist for several days in some parts. The fog is often dense with visibility reduced to a few meters.

Large variations in the fog pattern occur along the Greenland coast. Reports on the route from Godthab to Upernavik indicate an average frequency of about 12 days per month during May to August.

Marked improvement in visibility usually gives welcome relief on the lee side of headlands and all areas sheltered from onshore winds.

Falling or drifting snow is a frequent cause of bad visibility especially in the N parts of the region. Considerable amounts of fine powdery snow may be raised by even moderate winds.

Land radiation fog may develop in valleys near the coast during the early weeks of the navigation season and in the autumn, but this hazard seldom occurs during the summer months.

Exceptionally good visibility is often reported and mountain ranges may be visible at a distance of 100 miles or more. On the other hand, it may be difficult to recognize landmarks at short distances when the ground is covered with deep snow.

On the coast of Greenland, S of 75˚N, there is a maximum of fog in summer, but farther N there is a more even distribution.

Generally, going from the mouth to the head of a fjord, the frequency of fog decreases rapidly. The seasonal variation is also different, and in winter, when fog is infrequent at the mouth of a fjord, it will usually be more frequent near the head, because of the radiation fog called "frost smoke."

In summer, fog is often brought on to the coast by onshore winds and may on occasions last for several days. Summer sea-fog is common and often persistent N of a line from S Greenland to N of Norway, including Icelandic waters. Maximum frequency occurs in July. It may occur in form of either maritime or continental air mass. The ice edge is a particularly foggy zone and a belt of fog on the horizon may indicate the ice edge. The highest frequencies of fog occur near the cold East Greenland Current, the cold East Spitsbergen Current of the Barents Sea, and the cold East Iceland Current, with SW winds.

Shipping may be held up for weeks during spells of fog near Jan Mayen and Bjornoya. About 20 percent of observations report fog N of Iceland in early summer.

Winter fog hazard is much less frequent over most of the area. The worst affected region is the strip of cold water along the ice edge during E to SE winds. The N part of the Norwegian Sea is also shrouded in fog at times in light winds of Atlantic origin.

The clearance of sea fog in these high latitudes usually depends on a change of air supply or an increase in wind speed.

The development of land (radiation) fog rarely causes any serious hazard in this region. Patchy fog affects ports in the Barents Sea at times. Some fog may develop at the heads of fjords and in sheltered valleys in Iceland during winter nights. Radiation fog is almost unknown in Greenland.

Gale force winds are reported to frequent Jan Mayen and Spitsbergen. Condensation occurs when very cold air passes over much warmer water (a difference of 10˚C is required). These criteria exist with air coming directly off the Greenland ice-cap. The fjords of Iceland and Svalbard are also affected at times. Sea smoke is usually patchy and shallow, but sometimes dense. It may extend above mast height in parts of the fjords and restrict the movement of shipping. A change of wind and/or a sharp rise of temperature will clear the fog.

Visibility is generally very good away from the fog areas, except when affected by precipitation and very low clouds. Periods of poor visibility are common in snow storms, but only 5 per cent of observations give visibility below fog limits in moderate rain, drizzle, or showers.

Reports of mirage and displays of Aurora Borealis are quite common in this region, especially in the N.

Pressure

The lowest average pressure occurs off SW Iceland throughout the year and is where the "Iceland Low" is centered. Even so, the pressure varies considerably over short periods and occasional extensions of the Arctic anticyclone across the area will cause a substantial increase of pressure for a short period.

The greatest day to day variations occur off Iceland in winter as depressions and troughs move in and out of the area. Pressure may fall to between 920 and 930 mb at the center of a deep low, and maximum values of 1050 mb or over are registered when an anticyclone becomes dominant.

Depressions are most frequent to the S and W of Iceland and over a wide belt of the Norwegian Sea from Iceland to the Barents Sea; their tracks over the area are extremely variable and often erratic.

Two main tracks predominate, one running N and the other S of Iceland. Only a few pass directly across Iceland. These tracks are derived from the average movement of a large number of depressions. Each individual low will travel at varying speeds and directions at different times depending on the general pressure contours over a large area.

A number of depressions on a track farther S of Iceland often recurve NW and remain off the SW of Iceland for several days. South of the Greenland Sea is the spawning area where it favors the birth of new depressions.

Many depressions reaching the area from the W Atlantic acquire fresh vigor in this region. In other instances a new depression will develop on the trailing front of a depression which has moved up Davis Strait and become a vigorous system.

The large temperature difference between the air from the S and the cold air from Greenland is most favorable for cyclonic development off Kap Farvel. An occasional depression will cross central Greenland from the NW and then continue to move E or SE.

Navigational Information

Nautical Charts

Charts are mainly constructed from Danish surveys. Mariners requiring to enter the sounds or fjords of East Greenland are advised to obtain the appropriate Danish Charts.

Place Names

In 1988, the majority of the place names in West Greenland had been changed to Inuit (Eskimo) names; the same applies to Arctic Canada, but less extensively. Former names may still be found on charts for some time.

Listed below are Inuit names commonly used for major ports in W Greenland.

Obsolete name	New name
Egedesminde	Aaslaat
Jakobshavn	Ilulissat
Ivigtut	Ivittuut
Faeringehavn	Kangerluarsoruseq
Gronnedal	Kanggilinnguit
Sukkertoppen	Maniitsoq
Narssaq	Narsaq
Frederiksdal	Narsaq Kujalleq
Godthab	Nuuk
Frederikshab	Paamiut
Thule	Qaanaaq
Julianehab	Qaqortoq
Christianshab	Qasigiannguit
Godhavn	Qeqertarsuag
Holsteinborg	Sisimiut
Umanak	Uummannaq

Offshore Drilling

Offshore Exploration

Oil, gas, and mineral drilling and production rigs, whether permanent or temporary, fixed or floating, may be encountered in increasing numbers in Canadian and Greenland waters.

Regulations

Special Regulations

No visitors are allowed to enter the country without special permission from the Danish Government.

Non-Danish vessels do not have access to the harbors of W Greenland unless a special permit is granted by the Danish Government.

Vessels sailing under Danish flag can only apply for special permission to engage in commercial whaling, sealing, fishing, or hunting.

All vessels arriving at ports in Greenland should give 24 hour notice of their ETA to the port authority.

Special harbor regulations exist in all Greenland ports; copies can be obtained from the harbor authorities.

Before sailing for Greenland, a vessel must obtain a Health Certificate at the port of departure from an authorized medical practitioner stating that at the time of departure, no dangerous or infectious disease was found or detected in the port or its surroundings, and none on board had a venereal or other infectious disease, in an infectious stage.

The Health Certificate is valid only if it bears the stamp and signature of the Danish consul or vice-consulate situated within the jurisdiction of the port of departure.

On arrival in Greenland, the master must immediately report to the Port Authority and present the Health Certificate.

The Health Certificate may also be issued by a doctor in the first port of call in Greenland.

Fishing

Commercial fishing is prohibited inside 12 miles from the baselines, fixed as the basis for measuring the fishing limit; however, with the exception to persons residing in Greenland, or persons having businesses established in Greenland, and persons who have permanent connection with the Greenland community.

Fishing vessels entering the above mentioned area of sea without the right to fish must have all working gear stowed inboard and head in the direction of exiting the area.

Reporting of Pollution

In Greenland waters, Danish regulations require ship masters and managers of oil rigs to immediately report any incident caused, or suspect to cause, oil spillage or any other type of pollution. The report should include all details that might be of use to the environmental agency.

Sea Rescue—Search and Rescue (SAR)

The Danish Armed Forces Command conduct sea rescue operations in Greenland waters from a Sea Rescue Center at Gronnedal on Arsuk Fjord. When aerial assistance is required, the State Air Authority at the Air Rescue Center in Sondre Stromfjord is called.

To ensure all distress calls are received at the Sea Rescue Center, especially sent from the ships N of 57˚N and within 250 miles of the Greenland coast, the following must be observed:

1. All vessels around the Greenland coast should maintain continuous watch on R/T. (Distress frequencies are 2182 kHz and VHF channel 16).
2. Distress signals received by all vessels should be relayed to the closest Greenland coast radio station.
3. The master of every Danish vessel is required by law to render assistance at sea in emergency, but only if passengers, crew, and the assisting vessel are not in danger.
4. The assistance required by vessels of other nations is arranged by the Sea Rescue Center.
5. The control of the combined SAR service in Greenland waters is divided between the following:
   a. Greenland Command (GLK) situated in the Sea Rescue Center at Gronnedal on Arsuk Fjord.

b. The U.S. Air Force authorities at Camp Lloyd on Sondre Stromfjord and the Chief Constable.

6. A master of a vessel who initiates a SAR operation in Greenland waters must immediately call to report to GLK.

7. The Danish police in Greenland organize and control sea rescue operations in local waters. Life-boats are stationed at Nanortalik, Julianehab, Narssarssuaq, Sukkertoppen, and Holsteinborg.

8. A salvage vessel stationed at Faeringehavn from mid-May to mid-October may be contacted.

9. Rescue helicopters are available at Thule U.S. Air Force base.

10. Wooden craft in distress anywhere at sea should hoist some form of metallic radar reflector to assist detection.

Search and Rescue

Ship Reporting Systems

Two ship reporting systems have been established for the safety of shipping in Greenland waters and to assist in the coordination of search and rescue efforts, as follows:

1. GREENPOS—For vessels en route to or from Greenland in the area N of 57° Nand within 250 miles of the coast of Greenland. This system is compulsory for all Danish vessels, except naval vessels. Other vessels are invited to participate in the system.

2. KYSTKONTROL—For vessels navigating between ports and harbors along the Greenland coast. This system is compulsory for most Danish vessels exceeding 20 grt. Other vessels are invited to participate in the system. Ships on Atlantic voyages can remain in the GREENPOS system when on passage between ports in Greenland by agreement with Island Commander Greenland (ISCOMGL).

GREENPOS

There are four types of GREENPOS reports:

1. **Sailing Plan (SP).—**The SP contains the basic information needed to enter the vessel into GREENPOS. The report should be made when the vessel enters the GREENPOS area from sea, upon final departure from a port in Greenland, or when a ship not subject to compulsory reporting wishes to participate in the system.

2. **Position Report (PR).—**The PR should be sent four times daily, as follows:
   a. 0000-0030 UTC.
   b. 0600-0630 UTC.
   c. 1200-1230 UTC.
   d. 1800-1830 UTC.

3. **Deviation Report (DR).—**The DR should be sent when the vessel's position differs significantly from the position which would have been predicted from previous reports.

4. **Final Report (FR).—**The FR should be sent upon leaving the reporting area, on arrival at its destination in Greenland, or when a ship not subject to compulsory reporting wishes to leave the system.

The first line of a GREENPOS message is one of the following:

Type of Report	Format
SP	GREENPOS/SP//
PR	GREENPOS/PR//
DR	GREENPOS/DR//
FR	GREENPOS/FR//

Subsequent lines start with the line identifier followed by the date. See the Appendix for more information on the format of GREENPOS messages.

GREENPOS messages are sent free of charge and should be sent in the form of a radiotelegram directly to Island Commander Greenland (ISCOMGL), Groennedal, via Groennedal Naval Radiostation (OVC) or through a Coast Radio Station.

KYSTKONTROL

There are four types of messages, each of which starts with the line KYSTKONTROL, as follows

1. **Departure Report.—**Should be sent on departure from a port or harbor. The report must contain the following lines in the given sequence:
   a. Vessel name and call sign.
   b. DEPART/DEPARTED AT .... (local time).
   c. FROM .... (port of departure).
   d. TO .... (destination).
   e. ROUTE .... (brief details).
   f. ETA .... (local time).
   g. POB .... (persons on board).

2. **Arrival Report.—**Should be sent upon arrival at the next port. The report contains the following lines:
   a. Vessel name and call sign.
   b. ARRIVED .... (port of arrival).
   c. AT .... (local time).

3. **Deviation Report.—**Should be sent when changes are made to the route contained in the Departure Report or if the ETA will be exceeded by more than 1 hour. The report must contain the following lines:
   a. Vessel name and call sign.
   b. New ETA or reason for deviation.

4. **Position Report.—**If the voyage exceeds a duration of 24 hours, then at least one Position Report should be sent in every 24-hour period. The report must contain the following lines:
   a. Vessel name and call sign.
   b. POSITION AT .... (local time).
   c. Position (latitude/longitude, place name, true bearing and distance from well-known point).
   d. COURSE and SPEED.

For the purpose of transmitting KYSTKONTROL messages, Greenland waters have been divided into a number of control areas, each based on a Coast Radio Station known as the Ship Control Station. The limits these areas are, as follows:

1. Skibskontrol Ammassalik (OZL)—East coast N of 60˚31'N.
2. Skibskontrol Qaqortoq (OXF)—East coast S of 60˚31'N and W coast S of 61˚30'N.
3. Skibskontrol Aaslaat (OYR)—West coast N of 61˚30'N.

All reports should be addressed to SKIBSKONTROL followed by the name of the Ship Control Station of the destination. The report shall begin with the word "KYST-KONTROL." Reports with this prefix are carried free of charge and carry the priority URGENT.

Time Zone

The general time zone description is PAPA (+3). Daylight Savings Time (OSCAR (+2)) is maintained from the last Sunday in March until the Saturday before the last Sunday in October. The following areas maintain a different local time:

1. Mester Vig and Danmarkshavn maintain ZULU (UTC). Daylight Savings Time is not observed.
2. Scoresby Sound maintains NOVEMBER (+1). Daylight Savings Time (OSCAR (+2)) is maintained from the last Sunday in March until the Saturday before the last Sunday in October.
3. Thule maintains QUEBEC (+4). Daylight Savings Time (PAPA (+3)) is maintained from the first Sunday in April until the Saturday before the last Sunday in October.

World Time Zone Chart
http://www.odci.gov/cia/publications/factbook/ref/pdf/802801.pdf

U.S. Embassy

There is no U.S. diplomatic representation. Greenland is a self-governing overseas administrative division of Denmark.

Appendix

GREENPOS Message Reporting Format

Format	Sailing Plan	Position Report	Deviation Report	Final Report	Remarks
A/Vessel name/call sign//	R	R	R	R	
B/Date and time of report//	R	R	R	R	See Note 1.
C/Position by latitude/longitude//	R	R	R	R	See Notes 2 and 4.
D/Position by geographic location//	R	R	R	R	See Notes 3 and 4.
E/True course//	R	R			See Note 5.
F/Speed in knots//	R	R			See Note 6.
I/Destination and ETA//	R				Express ETA as in Note 2.
L/Planned passage//	R				See Note 7.
Q/Defects or limitations//					See Note 8.
S/Weather and ice conditions//	R	R	R	R	See Note 9.
X/Up to 65 characters of amplifying comments//	R	O	O	O	See Note 10.

KEY

R Required
O Optional

NOTES

1. Expressed as a six-digit group, DDHHMM, using UTC, where DD is the date (from 00 to 31), HH is the hour (from 00 to 23) and MM is minutes (from 00 to 59), followed by Z.
2. Latitude is expressed as a four-digit group, DDMM, where DD is degrees (from 00 to 90) and MM is minutes (from 00 to 59), followed by N or S.
3. Longitude is expressed as a five-digit group, DDDMM, where DDD is degrees (from 000 to 179) and MM is minutes (from 00 to 59), followed by E or W.
4. Either Line C or Line D may be used.
5. Expressed as a three-digit group.
6. Expressed as a two-digit group.
7. An abbreviated statement of planned route, e.g.: present position— great circle route to 100 miles S of Kap Farvel.
8. Details of any defects affecting ship's safety, e.g.: radar or VHF disabled.
9. Abbreviated details of weather conditions at time of report and ice conditions since last report, e.g.: SW5, ice edge seen from 6100N 03905W—state if ice not seen.
10. For Sailing Plan, number of persons on board (e.g. POB 16). May also add other relevant information affecting safety of own or other vessels.

Return to GREENPOS